# Time Based Flow Management
# (TBFM)

# Minimum
# Qualifications
# For Program Personnel

A list of TBFM key and non-key personnel with a description of the minimum qualifications for each position is provided in the following table. For non-key personnel, relevant experience may be substituted for a Bachelor's Degree at the discretion of the Government by the contracting officer.

| **Personnel Labor Categories** | |
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| **Key Personnel Minimum Qualifications** | |
| **Program Position** | **Minimum Qualifications** |
| Program Manager | Master's degree/Bachelors degree in engineering/engineering management, systems management or business field and at least 10 years of demonstrated experience related to program/project management. Of the years of management experience, the candidate must possess five (5) years of experience relating to the management/supervision of the design, development, test or acquisition of Air Traffic Control/Management (ATC/M) Systems with an average value of $100M or greater. |
| Software Engineering Manager | Master's or Bachelor's degree in computer science, mathematics or engineering; Master's degree with a minimum of twelve (12) years, or Bachelor's Degree with minimum of fifteen (15) years of experience in software engineering or software development. Ten (10) years of the experience must be in technical leadership or management of large, complex software development programs. Five (5) years direct experience with iCMM/CMMI. |
| ILS Manager | Bachelor's degree and ten (10) years experience with experience in all logistical elements of Section C9.0 of the SOW. |
| System Architect | Bachelor's Degree in an appropriate discipline with a minimum of ten (10) years of experience, seven (7) of the years experience must be in software engineering in the design, development and support of large, complex data processing systems. The System Architect must also have experience in the position of System Architect on at least one previous system development program. |
| Test Manager | Bachelor's Degree in an appropriate discipline and ten (10) years experience relevant experience includes, but is not limited to, performing test and system replacement functions, designing/developing test plans, writing test cases and test procedures and managing the execution of a test program of large, complex systems and subsystems. |
| Training Manager | Bachelor's Degree in an appropriate discipline and ten (10) years experience relevant experience includes, but is not limited to, developing training courses for large, complex systems and subsystems. |
| Human Factors Specialist | Bachelor's Degree in an appropriate discipline and ten (10) years experience; relevant experience includes, but is not limited to, experience with developing a human factors engineering program, usability assessments, familiarity with the FAA Human Factors Design Standards FAA-STD-004 and MIL-HDBK-46855, design, development, and implementation of user procedures for use in developmental HF testing, and managing the execution of a HF program of large, complex systems and subsystems. |
| System Engineering Lead | Master's degree with a minimum of ten (10) years, or Bachelor's Degree with a minimum of fifteen (15) years experience in system engineering. This experience must be in Air Traffic Control (ATC/M) Systems and demonstrated expertise in all technical areas from concept design to full deployment of systems. |
| **Non-Key Personnel Labor Categories** | |
| **Program Position** | **Minimum Qualifications** |
| Task Leader/Business Manager | Bachelor's degree in Computer Science, engineering or a related field (example, math, physics,) and ten (10) years of experience in management, programming, engineering, test or related field and a demonstrated ability to lead personnel and |

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| | maintain standards. Good verbal and written communication skills are required. Has progressively responsible management experience in planning, tracking and oversight. A demonstrable ability to lead personnel and maintain professional business standards is essential. Four years additional experience may be substituted for degree requirement. |
| Program Control | This labor category includes the following types of staff: Business Analysts, Earned Value Management System (EVMS) staff, scheduler, Subcontracts Manager, GFI/GFE Manager. As a minimum, the staff should have a Bachelor's Degree in an appropriate discipline and a minimum of two (2) years directly related experience, or a minimum of five (5) years of directly related experience. As applicable, the staff should have broad knowledge of general and corporate business practices, government and commercial contracting regulations and principles, accounting and finance principles, and program scheduling. |
| Support Staff | This labor category includes the following types of staff: design draftsman, administrative assistant and support, program librarian, LAN and system administrator, development and test lab support staff, and technicians. As a minimum, the staff should have a Bachelor's Degree in an appropriate discipline plus two (2) years experience, or a minimum of five (5) years directly related experience. |
| Sr. Configuration Management | Bachelor's Degree in an appropriate discipline with a minimum of six (6) years of experience in performing Configuration Management (CM) of a program similar in size to TBFM. Individuals provide management oversight of baseline management, hardware release, configuration item identification, and software builds. Works with program staff to support the conduct of CM planning, management, and implementation status. Works with program staff to control configuration items, product traceability matrices, document and data electronic management, CM records and software libraries. |
| Configuration Management Staff | Bachelor's Degree in an appropriate discipline with a minimum of two (2) years of experience. Individuals will provide direct support to the CM Manager and senior configuration management staff in the planning and implementation of CM processes for the TBFM program. The CM analyst will assess existing program documentation and processes relating to or affecting CM; assist in ensuring all applicable CM policy and procedures have been implemented, and provide assistance to ensure effective management of documents, databases, NAS change proposals, and AUA document change requests. Supports test environment identification and control, verifies installation procedures, and documents software version descriptions. Performs change management and status accounting. |
| Sr. Quality Control | Bachelor's Degree in an appropriate discipline with a minimum of six (6) years of experience in performing as the Quality Assurance (QA) lead of a program similar in size to TBFM. Individuals must have the experience and capability to manage the QA program in accordance with ANSI/ASQC ISO-9001-2000 Quality Management and Quality Assurance Standards – Guidelines for Selection and Use. Works with general direction to provide supervisory support for QA product audits/verifications, process compliance audits, physical configuration audits, functional configuration audits, and hardware inspections. Manages the status of quality conformance, tests, and audits. Controls non-conforming products, measurement test equipment calibration, and acceptance tests. Completes quality records and reports and corrective and preventive action status and reports. |
| Quality Control Staff | Bachelor's Degree in an appropriate discipline with a minimum of two (2) years of experience. Individuals will provide direct support to the QA Manager in the planning and implementation of QA processes for the TBFM program. The QA |

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| | staff will assist in ensuring all applicable QA policy and procedures have been implemented. |
| Software Engineering | This labor category consists of senior, mid-level, and entry level software engineers.<br>- Senior: Bachelor's Degree in computer science, scientific, or appropriate engineering discipline and eight (8) years of relevant experience. Under general supervision, formulates and defines specifications for complex software applications or modifies/maintains existing complex applications. Responsible for applications dealing with the overall operating system, such as sophisticated file maintenance routines, large telecommunications networks, and/or advanced mathematical/scientific software packages. Competent to work at the highest technical level in all phases of software systems, including design, coding, software integration, and system integration. Very familiar with Software Development Standards cited in this contract or equivalent. Very experienced with structured software development and modern software productivity tools and techniques.<br>- Mid-level: Bachelor's Degree in computer science, scientific, or appropriate engineering discipline and four (4) years of relevant experience. Under general supervision, works from specifications to develop or modify moderately complex software applications. Assists with design, coding, testing, software and system integration, and documentation of programs. Competent to work independently in most phases of software systems, but requires instruction and guidance in other phases. Familiar with Software Development Standards cited in this contract or equivalent. Experienced with structured software development and modern software productivity tools and techniques.<br>- Entry level: Bachelor's Degree in appropriate engineering or scientific discipline or two (2) years relevant experience. Under direct supervision, works from specifications to assist in developing and modifying operating software and programming applications. Assists with design, coding, testing, software and system integration, and documentation of programs. |
| Hardware Engineering | This labor category consists of senior, mid-level, and entry level hardware engineers.<br>- Senior: Bachelor's Degree in appropriate engineering discipline and eight (8) years of relevant experience. Under general supervision, able to perform analytical and technical tasks to support the planning, design, documentation, and installation of new computer-based, complex systems. Analyzes new product designs against system requirements, develops specifications for developed or purchased hardware, develops and implements analysis techniques to test the hardware's ability to meet all specification requirements including R/M/A, power, safety, and security. Supports all phases of system development.<br>- Mid-level: Bachelor's Degree in appropriate engineering discipline and four (4) years of relevant experience. Under general supervision, performs analytical and technical tasks to support the planning, design, documentation, and installation of new computer-based, complex systems. Analyzes new product designs against system requirements, develops specifications for developed or purchased hardware, develops and implements analysis techniques to test the hardware's ability to meet all specification requirements including R/M/A, power, safety, and security. |

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| | Supports all phases of system development.<br>- Entry level: Bachelor's Degree in appropriate engineering or scientific discipline or two (2) years of relevant experience. With direct supervision, assists in performing analytical, technical, and administrative tasks that support the planning, design, documentation, and installation of new computer-based, complex systems. Assists in the analysis of new product designs against system requirements. Supports all phases of system development, as directed. |
| Training Engineering | This labor category consists of senior, mid-level, and entry level training engineers.<br>- Senior: Bachelor's Degree in appropriate discipline and eight (8) years of relevant experience. Under general supervision, organizes, prepares and conducts complex training and educational programs for ATC systems. May design and develop programs using state-of-the-art computer based instruction (CBI), web-based training (WBT), or other commercial training techniques and tools. Can prepare a high-level, system-wide training program for a variety of ATC users. Understands and uses the techniques and technologies required to develop and conduct familiarization training, initial cadre training, and refresher training in various formats, including classroom and computer based instruction (CBI).<br>- Mid-level: Bachelor's Degree in appropriate discipline and four (4) years of relevant experience. Under general direction, organizes, prepares and conducts complex training and educational programs for ATC systems. May design and develop programs using state-of-the-art CBI, WBT, or other commercial training techniques and tools. Can prepare a high-level, system-wide training program for a variety of TFM users. Understands and uses the techniques and technologies required to develop and conduct familiarization training, initial cadre training, and refresher training in various formats, including classroom and CBI.<br>- Entry level: Bachelor's Degree in appropriate discipline or two (2) years relevant experience. Under direct supervision, develops and conducts basic training programs. Able to use relevant techniques and technologies to develop and conduct familiarization training, initial cadre training, and refresher training. |
| ILS Engineering | This labor category consists of senior, mid-level, and entry level ILS engineers.<br>- Senior: Bachelor's Degree in scientific or appropriate engineering discipline and five (5) years of relevant experience. Under general supervision, performs logistics support analysis (LSA); maintenance planning and support; supply support; site survey, installation, test, and check-out of system hardware and software; obsolescence management and disposition of system elements. Manages the operations and maintenance activities and personnel of large, complex computer based information systems. Performs failure modes and effects analysis and provisioning analysis.<br>- Mid-level: Bachelor's Degree in scientific or appropriate engineering discipline and two (2) years of relevant experience. Under minimal supervision, performs logistics support analysis (LSA); maintenance planning and support; supply support; site survey, installation, test, and check-out of system hardware and software; obsolescence management and disposition of system elements, as directed. Performs operations and maintenance activities for complex computer based information systems.<br>- Entry level: Bachelor's Degree in appropriate engineering or scientific |

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| | discipline or two (2) years relevant experience. Under direct supervision, assists with logistics support analysis (LSA); maintenance planning and support; supply support; site survey, installation, test, and check-out of system hardware and software; obsolescence management and disposition of system elements, as directed. Supports operations and maintenance activities for complex computer based information systems. |
| System Engineering | This labor category includes the following positions: system engineers, system performance analysts, TFM subject matter experts, Reliability/Maintainability/Availability (R/M/A) Engineers, Security Engineers, and Safety Engineers.<br><br>The System Engineering positions include senior, mid-level, and entry level system engineers.<br><br>- Senior: Bachelor's Degree in scientific or engineering discipline and eight (8) years of relevant experience. Under general supervision, formulates and defines system scope and objectives based on user needs and specifications, research, and fact-finding. Devises or modifies procedures to solve complex problems, considering computer equipment capacity and limitations, operating time, and form of desired results. Defines and develops system requirements, documenting the requirements in detailed specifications from which programs will be developed and/or procured, and from which hardware will be developed and/or procured. Coordinates design of subsystems and integration of total system. Analyzes and revises existing system logic difficulties and documentation as necessary. Analyzes and resolves difficult and complicated program support deficiencies. Conducts independent technical investigations in systems design. Competent to work at the highest technical level of all phases of systems engineering activities.<br><br>- Mid-level: Bachelor's Degree in scientific or engineering discipline and four (4) years of relevant experience. Under general supervision, formulates and defines system scope and objectives based on user needs and specifications, research, and fact-finding to develop or modify moderately complex computer systems. Defines and develops system requirements, documenting the requirements in detailed specifications from which programs will be developed and/or procured, and from which hardware will be developed and/or procured. Analyzes and revises existing system logic difficulties and documentation as necessary. Competent to work on most phases of applications systems analysis activities.<br><br>- Entry level: Bachelor's Degree in engineering or scientific discipline or two (2) years relevant experience. Under direct supervision, assists in research and fact-finding to develop or modify information and computer systems. Assists in preparing detailed specifications from which programs will be written and/or procured, and from which hardware will be developed and/or procured. Analyzes and revises existing system logic difficulties and documentation as necessary. |
| Test Engineering | This labor category consists of senior, mid-level, and entry level test engineers.<br><br>- Senior: Bachelor's Degree in computer science, scientific, or appropriate engineering discipline and eight (8) years of relevant experience. Under general supervision, formulates and defines system level test plans and objectives. Devises or modifies plans and procedures to create a testing program, considering system requirements, intended use of the system, facility constraints and equipment, and need to involve system users. Able to develop the high level and detailed design for system test plans, test |

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| | schedules, test cases, test software and tools. Competent to work on all phases of the test program, including planning, procedure development, and test conduct. Very experienced with structured software development and modern software test tools and techniques.<br>- Mid-level: Bachelor's Degree in computer science, scientific, or appropriate engineering discipline and four (4) years of relevant experience. Under general supervision, formulates and defines system scope and objectives through research and fact-finding to solve complex testing problems. Prepares detailed specifications from which test software will be written. Designs, codes, tests and debugs testing software and tools. Competent to work on most phases of the test program. Moderately experienced with structured software development and modern software test tools and techniques.<br>- Entry level: Bachelor's Degree in computer science, scientific, or appropriate engineering discipline or two (2) years relevant experience. Under direct supervision, assists in research and fact-finding to solve complex testing problems. Assists in preparation of detailed specifications from which test software will be written. Designs, codes, tests, debugs, documents, and maintains those programs. |
| Human Factors Engineering | This labor category consists of senior, mid-level, and entry level human factors (HF) engineers.<br>- Senior: Bachelor's Degree in appropriate discipline and five (5) years of relevant experience. Under general supervision, can design and develop a human factors engineering program coordinated with system users, and can design and develop usability assessments. Is very familiar with the FAA Human Factors Design Standards andMIL-HDBK-46855. Understands the design, development, and implementation of user procedures for use in developmental HF testing, and has experience with the execution of a HF program for a large, complex system. Able to identify critical HF engineering design issues, conduct trade studies and tests utilizing mockups, models, and/or simulations. Can identify special skill and training issues and requirements, and can provide requirements to ILS and training community. Able to participate with a multi-disciplinary team to develop the top level design of a complex, user-interactive system. Can evaluate designs to ensure that they meet operability, maintainability, and personnel safety requirements.<br>- Mid-level: Bachelor's Degree in appropriate discipline and two (2) years of relevant experience. With little supervision, can assist in the development of a human factors engineering program. Is familiar with MIL-HDBK-46855. Understands the design, development, and implementation of user procedures for use in developmental HF testing and is able to develop procedures that would support HF testing for a large, complex system. Able to assist in the identification of critical HF engineering design issues, conduct trade studies and tests utilizing mockups, models, and/or simulations. Can assist in the identification of special skill and training issues and requirements. Able to participate with a multi-disciplinary team to develop the top level design of a complex, user-interactive system. Can evaluate designs to ensure that they meet operability, maintainability, and personnel safety requirements.<br>- Entry level: Bachelor's Degree in appropriate discipline or two (2) years relevant experience. Under direct supervision, can assist in the |

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| | development of a human factors engineering program. Is familiar with general human factors standards. With supervision, is able to develop procedures that would support HF testing for a large, complex system. Able to assist in the identification of critical HF engineering design issues, conduct trade studies and tests utilizing mockups, models, and/or simulations. Able to participate with a multi-disciplinary team to develop the top level design of a complex, user-interactive system. |
| Air Traffic Control Specialist | - Senior: At least 25 years of air traffic control experience in medium to high density facilities, have held at least one FAA position in addition to controller (e.g., supervisor, staff officer, controller at both a TRACON and an ARTCC), and have experience with at least one FAA automation or enhancement initiatives (e.g., CTAS Cadre member, HOCSR requirements analysis, STARS evaluation team member, Participant in Human Factors Teams, Participant in Capacity Simulation Studies).<br>- Mid-level: At least 15 years of air traffic control experience in at least a medium density facility and have held at least one FAA position in addition to controller (e.g., supervisor, staff officer, controller at both a TRACON and an ARTCC) and have experience with at least one FAA automation or enhancement initiatives (e.g., CTAS Cadre member, HOCSR requirements analysis, STARS evaluation team member, Participant in Human Factors Teams, Participant in Capacity Simulation Studies).<br>- Entry level: At least 5 years of air traffic control experience and familiarity with at least one FAA automation or enhancement initiatives (e.g., CTAS Cadre member, HOCSR requirements analysis, STARS evaluation team member, Participant in Human Factors Teams, Participant in Capacity Simulation Studies). |
| Airway Facilities Specialist | - Senior: At least 25 years of operational experience in the operation and maintenance of FAA facilities.<br>- Mid-level: At least 15 years of operational experience in the operation and maintenance of FAA facilities.<br>- Entry level: At least 5 years of operational experience in the operation and maintenance of FAA facilities. |